भारतीय मानक
Indian Standard

IS 7202 : 2017
(Reaffirmed 2022)

गैस सिलेंडर वाल्व और सिलेंडर गर्दन की घटना धागों के निरीक्षण गॉजिस चेकिंग के लिए प्रकार चार (आकार 1, 2, 3) — विशिष्टि

(पहला पुनरीक्षण)

Inspection Gauges for Checking Type iv (Size 1, 2, 3) Taper Threads of Gas Cylinder Valves and Cylinder Necks — Specification

(First Revision)

ICS 23.020.30

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भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुरशाह ज़फर मार्ग, नई दिल्ली–110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI-110002
www.bis.org.in www.standardsbis.in

December 2017 **Price Group 7**

Gas Cylinders Sectional Committee, MED 16

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Gas Cylinders Sectional Committee had been approved by the Mechanical Engineering Divisional Council.

This standard was originally published in 1977. In this revision all the amendments have been incorporated and the following major changes have been made:

a) 15.24 mm thread has been deleted since same has become obsolete, and
b) Master check plain plug gauges and check thread plug gauges have been introduced.

The composition of the Committee responsible for the formulation of this standard is given in Annex D.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

INSPECTION GAUGES FOR CHECKING TYPE IV (SIZE 1, 2, 3) TAPER THREADS OF GAS CYLINDER VALVES AND CYLINDER NECKS — SPECIFICATION

(First Revision)

1 SCOPE

This standard specifies the dimensions, tolerances and material requirement of inspection gauges recommended for checking the taper threads on valve stems and the taper threads on cylinder necks for compressed gas cylinders threads conforming to “Type IV (Sizes 1, 2 and 3) taper 1:8 on diameter” of IS 3224.

2 REFERENCES

This standards listed below contain provisions which, through reference in this text constitute provisions of this standard. At the time of publication, the editions were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

IS No.	*Title*
1570 (Part 6) : 1996	Schedules for wrought steel : Part 6 Carbon and alloy tool steels
1586 : 2000	Method for Rockwell hardness test for metallic material (scales A - B - C - D - E - F - G - H – K 15N, 30N, 45N, 15T, 30T and 45T) (*third revision*)
3073 : 1967	Assessment of Surface roughness
3748 : 1990	Tool and die steels — Specification

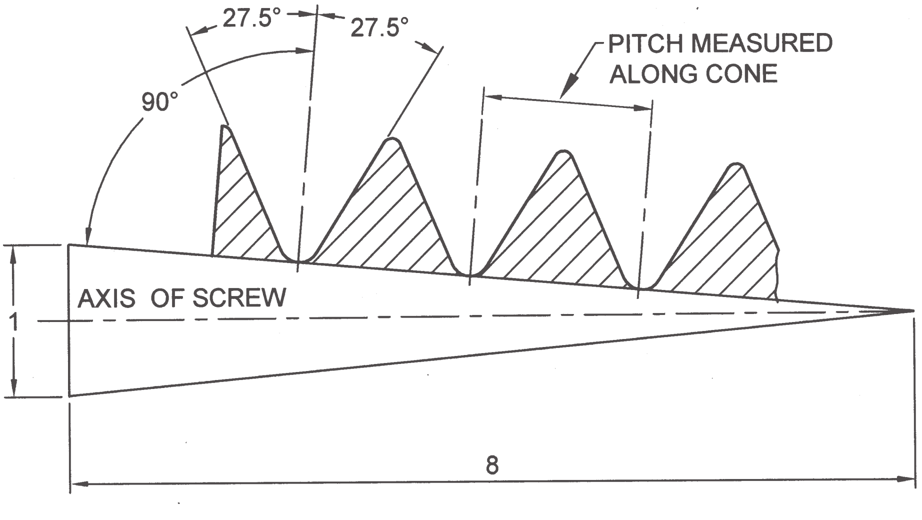
3 MATERIAL

3.1 Inspection Gauges shall be made of wear resisting steel conforming grade T 20 of IS 1570 (Part 6) or designation T90Mn6WCr2 of IS 3748 or any other equivalent material.

4 THREAD FORM

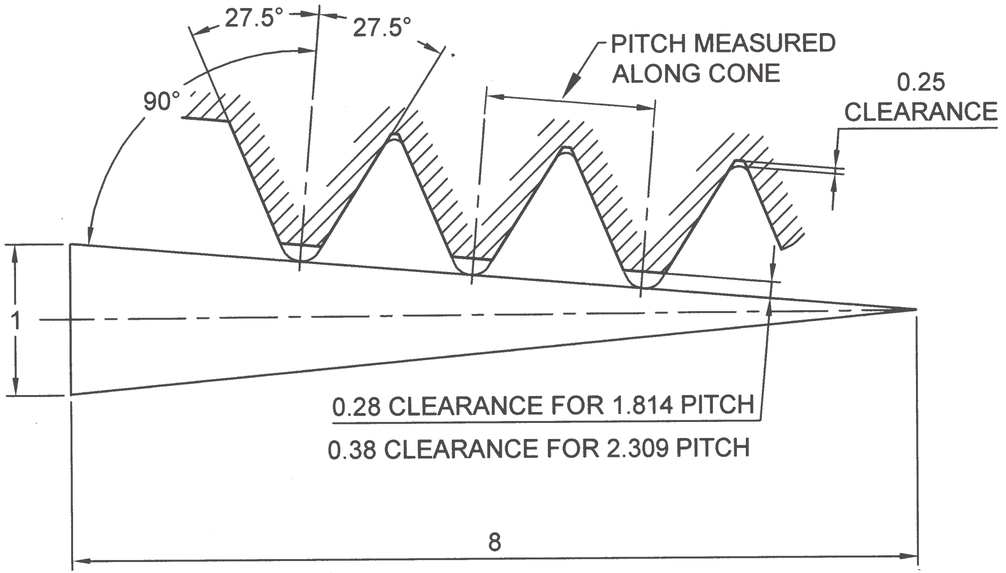
4.1 Basic Thread Form (*see* Fig. 1and Fig. 2)

4.2 Principal Dimensions (*see* Table 1A & 1B)



All dimensions in millimetres.

FIG. 1 FORM OF THREAD FOR GAUGES A AND E


27.5°
27.5°
90°
PITCH MEASURED ALONG CONE
0.25 CLEARANCE
1
0.28 CLEARANCE FOR 1.814 PITCH
0.38 CLEARANCE FOR 2.309 PITCH
8

All dimensions in millimetres.

FIG. 1 FORM OF THREAD FOR GAUGES A AND E

Table 1A Principal Dimensions of Type 4 Taper Screw Threads on Valve Stems and in Cylinder Neck

All dimensions in millimetres.

Size Designation	Nominal Size of Valve	Taper on Diameter	Pitch Measured Along the Cone	Stem Major Diameter	Length of Thread	Cylinder Neck Major Diameter	Length of Engagement	Length of Thread in Cylinder Neck
				Max		*Min*	*Min*	*Min*
Size 1	18.16	1:8	1.814	18.160	$22.23^{+3.17}_{-0}$	20.142	15.88	22.33
Size 2	25.40	1:8	1.814	25.400	$25.40^{+3.17}_{-0}$	27.788	19.05	25.40
Size 3	31.75	1:8	2.309	31.750	$31.75^{+3.17}_{-0}$	34.925	25.40	31.75

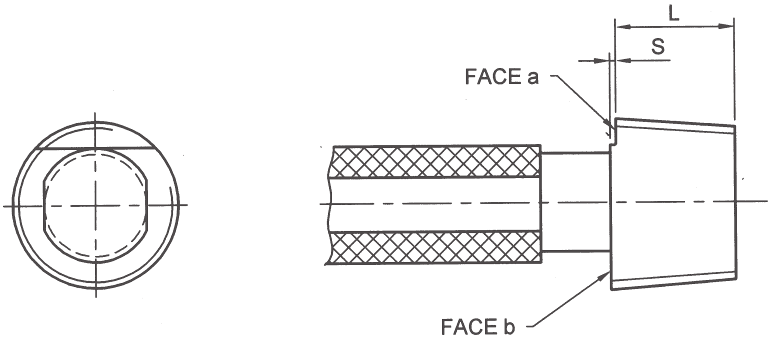
Table 1B Limits for Type 4 Taper Screw Threads on Valve Stems and in Cylinder Neck

All dimensions in millimetres.

Size Designation	Nominal Size of Valve	Thread Element	Diameter of Thread on Valve Stem at Small End		Diameter of Thread at Mouth of Cylinder	
			Max	*Min*	*Max*	*Min*
Size 1	18.16	Major Dia.	18.160	17.958	20.414	20.142
		Pitch Dia.	16.998	16.863	19.114	18.979
		Minor Dia.	15.834	15.563	18.019	17.816
Size 2	25.40	Major Dia.	25.400	25.197	28.059	27.788
		Pitch Dia.	24.237	24.102	26.759	26.624
		Minor Dia.	23.073	22.802	25.664	25.461
Size 3	31.75	Major Dia.	31.750	31.483	35.281	34.925
		Pitch Dia.	30.269	30.091	33.622	33.444
		Minor Dia.	28.788	28.433	32.230	31.963

5 DIMENSIONS AND TOLERANCE OF GAUGES FOR CHECKING THREADS IN CYLINDER NECK

5.1 Full Form Plug Screw Gauge, for Checking Threads in Cylinder Neck — Gauge A



All dimensions in millimetres.

Nominal Size[1]	*Dimension*	*Nominal Value*	*Tolerance*		*Taper*
			Plus	*Minus*	
18.16	Major diameter at face *a*	20.142	0	0.015	1 in 8 on diameter
	Pitch diameter at face *a*	18.979	0	0.015	
	Minor diameter at face *a*	17.816	0	0.023	
	S	1.19	0.03	0	
	L	15.88	0.25	0.250	
25.40	Major diameter at face *a*	27.788	0	0.015	1 in 8 on diameter
	Pitch diameter at face *a*	26.624	0	0.015	
	Minor diameter at face *a*	25.461	0	0.023	
	S	1.19	0.03	0	
	L	19.05	0.25	0.250	
31.75	Major diameter at face *a*	34.925	0	0.023	1 in 8 on diameter
	Pitch diameter at face *a*	33.444	0	0.023	
	Minor diameter at face *a*	31.963	0	0.035	
	S	1.60	0.03	0	
	L	25.40	0.25	0.250	

[1] Represents the maximum major diameter at the small end of valve stem.

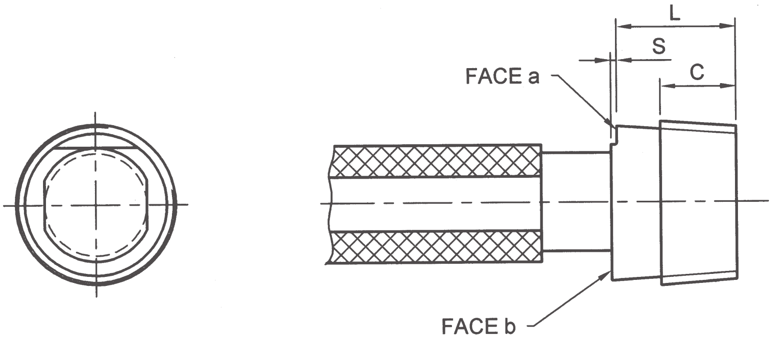
NOTES

1 The pitch diameter should not fall below the minimum value stated. After adding to this measured size the diametral equivalent of any errors present in the flank angles, the result should not exceed the maximum value stated for the pitch diameter.

2 The tolerance for pitch is 0.005 mm and that is the maximum error permitted in the relative axial positions of any two threads along the length of the gauge. The error may be plus or minus.

3 The gauge is so designed that when pressed or screwed home by hand, the neck of the cylinder should lie flush with or protrude beyond face *a*, but not beyond face *b*.

5.2 Plug Screw Gauge for Checking Pitch Diameter of Thread in Cylinder Neck — Gauge B



(FOR FORM OF THREAD SEE FIG. 2)

All dimensions in millimetres.

*Nominal Size*1)	*Dimension*	*Nominal Value*	*Tolerance*		*Taper*
			Plus	*Minus*	
18.16	Pitch diameter at face *a*	18.979	0	0.015	
	S	1.19	0.03	0	1 in 8 on diameter
	L	12.70	0.25	0.25	
	C	7.94	0.25	0.25	
25.40	Pitch diameter at face *a*	26.624	0	0.015	
	S	1.19	0.03	0	1 in 8 on diameter
	L	17.46	0.25	0.25	
	C	7.94	0.25	0.25	
31.75	Pitch diameter at face *a*	33.444	0	0.023	
	S	1.60	0.03	0	1 in 8 on diameter
	L	22.22	0.25	0.25	
	C	9.52	0.25	0.25	

1) Represents the maximum major diameter at the small end of valve stem.

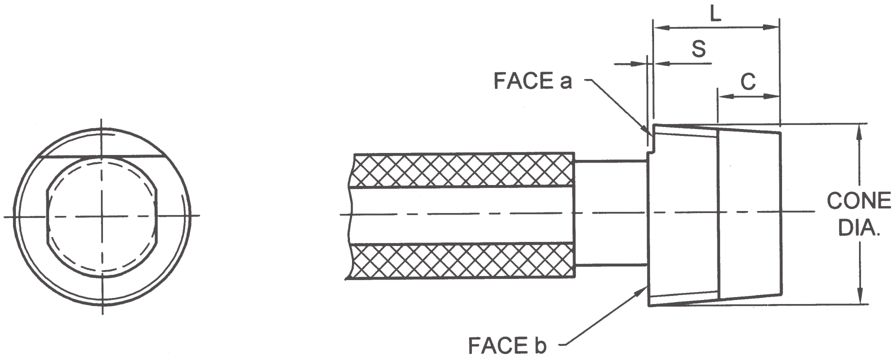
NOTES

1 The pitch diameter gauge is intended to operate about half way along the thread in the cylinder neck.

2 The pitch diameter should not fall below the minimum value stated. After adding to this measured size the diametral equivalent of any errors present in the flank angles, the result should not exceed the maximum value stated for the effective diameter.

3 The gauge is so designed that when pressed or screwed home by hand, the neck of the cylinder, should lie flush with or protrude beyond face *a*, but not beyond face *b*.

5.3 Plain Plug Gauge for Checking Minor Diameter at Small End – Gauge C



All dimensions in millimetres.

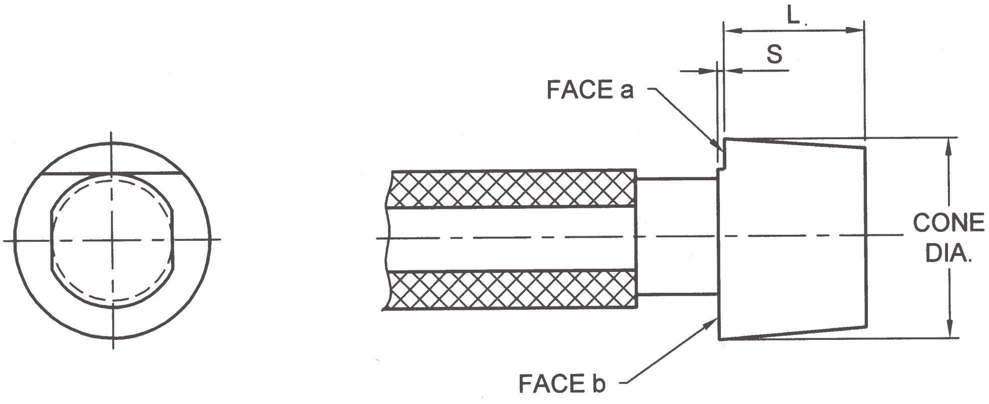
CLAUSE NO. 5.3

Nominal Size[1]	*Dimension*	*Nominal Value*	*Tolerance*		*Taper*
			Plus	*Minus*	
18.16	Cone diameter at face *a*	17.816	0	0.015	
	S	1.75	0.03	0	1 in 8 on diameter
	L	15.88	0.25	0.25	
	C	7.94	0.25	0.25	
25.40	Cone diameter at face *a*	25.461	0	0.015	
	S	1.75	0.03	0	1 in 8 on diameter
	L	19.05	0.25	0.25	
	C	7.94	0.25	0.25	
31.75	Cone diameter at face *a*	31.963	0	0.023	
	S	2.31	0.03	0	1 in 8 on diameter
	L	25.40	0.25	0.25	
	C	9.52	0.25	0.25	

[1] Represents the maximum major diameter at the small end of valve stem.

NOTE — The gauge is so designed that when pressed or screwed home by hand, the neck of the cylinder, should lie flush with or protrude beyond face *a*, but not beyond face *b*.

5.4 Plain Plug Gauge for Checking Minor Diameter at Large End in Cylinder Neck 6 Gauge D



All dimensions in millimetres.

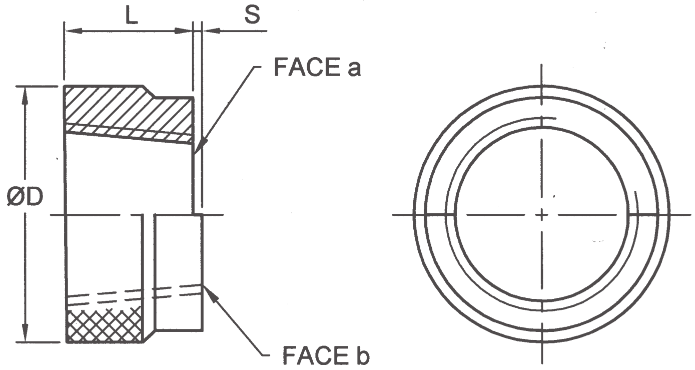
Nominal Size[1]	*Dimension*	*Nominal Value*	*Tolerance*		*Taper*
			Plus	*Minus*	
18.16	Cone diameter at face *a*	17.816	0	0.015	
	S	1.75	0.03	0	1 in 8 on diameter
	L	7.94	0.25	0.25	
25.40	Cone diameter at face *a*	25.461	0	0.015	
	S	1.75	0.03	0	1 in 8 on diameter
	L	7.94	0.25	0.25	
31.75	Cone diameter at face *a*	31.963	0	0.023	
	S	2.31	0.03	0	1 in 8 on diameter
	L	9.52	0.25	0.25	

[1] Represents the maximum major diameter at the small end of valve stem.

NOTE — The gauge is so designed that when pressed or screwed home by hand, the neck of the cylinder, should lie flush with or protrude beyond face *a*, but not beyond face *b*.

6 DIMENSIONS AND TOLERANCES OF GAUGES FOR CHECKING THREADS ON TAPER STEM

6.1 Full Form Ring Screw Gauge for Checking Thread on Taper Stem — Gauge E



(FOR FORM OF THREAD SEE FIG. 1)

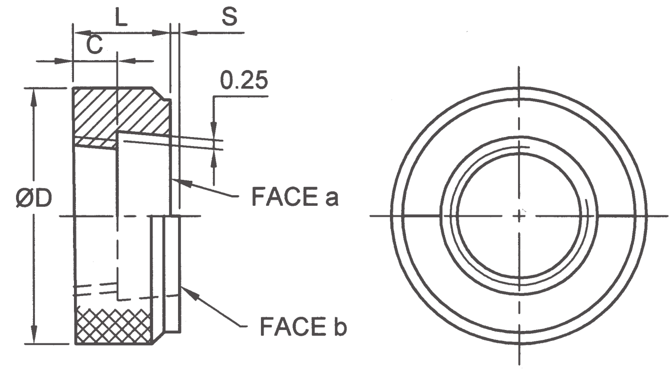
All dimensions in millimetres.

Nominal Size[1]	*Dimension*	*Nominal Value*	*Tolerance*		*Taper*
			Plus	*Minus*	
18.16	Major diameter at face *a*	18.161	0.023	0	
	Pitch diameter at face *a*	16.998	0.015	0	1 in 8 on diameter
	Minor diameter at face *a*	15.834	0.015	0	
	S	1.19	0.03	0	
	L	19.05	0.25	0.25	
	D	44.45	1.59	1.59	
25.40	Major diameter at face *a*	25.400	0.023	0	
	Pitch diameter at face *a*	24.237	0.015	0	1 in 8 on diameter
	Minor diameter at face *a*	23.073	0.015	0	
	S	1.19	0.03	0	
	L	22.22	0.25	0.25	
	D	44.45	1.59	1.59	
31.75	Major diameter at face *a*	31.750	0.036	0	
	Pitch diameter at face *a*	30.269	0.023	0	1 in 8 on diameter
	Minor diameter at face *a*	28.788	0.023	0	
	S	1.60	0.03	0	
	L	28.58	0.25	0.25	
	D	50.80	1.59	1.59	

[1] Represents the maximum major diameter at the small end of valve stem.

NOTE — The gauge is so designed that when pressed or screwed home by hand, the stern of the cylinder valve, should lie flush with or protrude beyond face *a*, but not beyond face *b*.

6.2 Screw Ring Gauge for Checking Pitch Diameter of Taper Stem — Gauge F



(FOR FORM OF THREAD SEE FIG. 2)

All dimensions in millimetres.

Nominal Size[1]	*Dimension*	*Nominal Value*	*Tolerance*		*Taper*
			Plus	*Minus*	
18.16	Pitch diameter at face *a*	16.998	0.015	0	
	S	1.19	0.03	0	1 in 8 on diameter
	L	15.88	0.25	0.25	
	C	7.94	0.25	0.25	
	D	44.45	1.59	1.59	
25.40	Pitch diameter at face *a*	24.237	0.015	0	
	S	1.19	0.03	0	1 in 8 on diameter
	L	17.46	0.25	0.25	
	C	7.94	0.25	0.25	
	D	44.45	1.59	1.59	
31.75	Pitch diameter at face *a*	30.269	0.023	0	
	S	1.6	0.03	0	1 in 8 on diameter
	L	22.22	0.25	0.25	
	C	9.52	0.25	0.25	
	D	50.80	1.59	1.59	

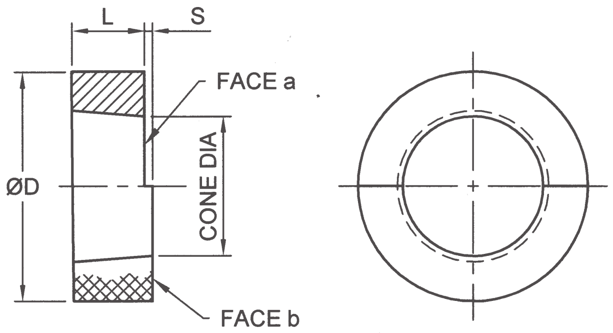
1) Represents the maximum major diameter at the small end of valve stem.

NOTES

1 The pitch diameter gauge is intended to operate about half way along the thread on the stem.

2 The gauge is so designed that when pressed or screwed home by hand, the stem of the cylinder valve, should lie flush with or protrude beyond face *a*, but not beyond face *b*.

6.3 Plain Ring Gauge for Checking Major Diameter at Small End of Taper Stem 6 Gauge G



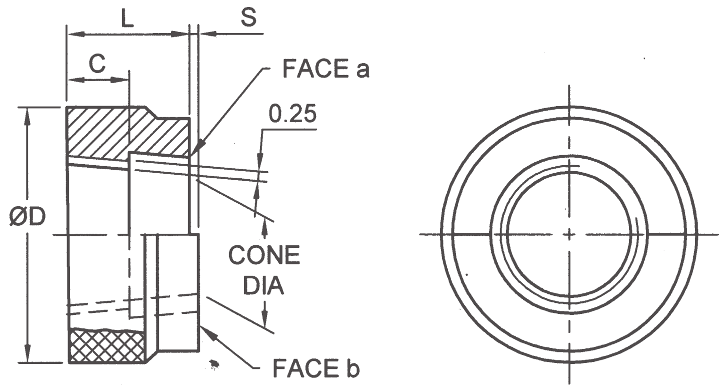
All dimensions in millimetres.

Nominal Size[1)]	*Dimension*	*Nominal Value*	*Tolerance*		*Taper*
			Plus	*Minus*	
18.16	Cone diameter at face *a*	18.160	0.015	0	
	S	1.75	0.03	0	1 in 8 on diameter
	L	7.94	0.25	0.25	
	D	44.45	1.59	1.59	
25.40	Cone diameter at face *a*	25.400	0.015	0	
	S	1.75	0.03	0	1 in 8 on diameter
	L	7.94	0.25	0.25	
	D	44.45	1.59	1.59	
31.75	Cone diameter at face *a*	31.750	0.023	0	
	S	2.31	0.03	0	1 in 8 on diameter
	L	9.52	0.25	0.25	
	D	50.80	1.59	1.59	

1) Represents the maximum major diameter at the small end of valve stem.

NOTE — The gauge is so designed that when pressed or screwed home by hand, the stem of the cylinder valve, should lie flush with or protrude beyond face *a*, but not beyond face *b*.

6.4 Plain Ring Gauge for Checking Major Diameter at Large End of Taper Stem % Gauge H



All dimensions in millimetres.

CLAUSE NO. 6.4

Nominal Size[1]	*Dimension*	*Nominal Value*	*Tolerance*		*Taper*
			Plus	*Minus*	
18.16	Cone diameter at face *a*	18.160	0.015	0	
	S	1.75	0.03	0	1 in 8 on diameter
	L	19.05	0.25	0.25	
	C	7.94	0.25	0.25	
	D	44.45	1.59	1.59	
25.40	Cone diameter at face *a*	25.400	0.015	00	
	S	1.75	0.03	0	1 in 8 on diameter
	L	22.22	0.25	0.25	
	C	7.94	0.25	0.25	
	D	44.45	1.59	1.59	
31.75	Cone diameter at face *a*	31.75	0.023	0	
	S	2.31	0.03	0	1 in 8 on diameter
	L	28.58	0.25	0.25	
	C	9.52	0.25	0.25	
	D	50.80	1.59	1.59	

[1] Represents the maximum major diameter at the small end of valve stem.

NOTE ? The gauge is so designed that when pressed or screwed home by hand, the stem of the cylinder valve, should lie flush with or protrude beyond face *a*, but not beyond face *b*.

6.4.1 *Methodology*

For using of the master check plug for checking plain ring gauges for major diameter at small end (Gauge G) and major diameter at large end (Gauge H).

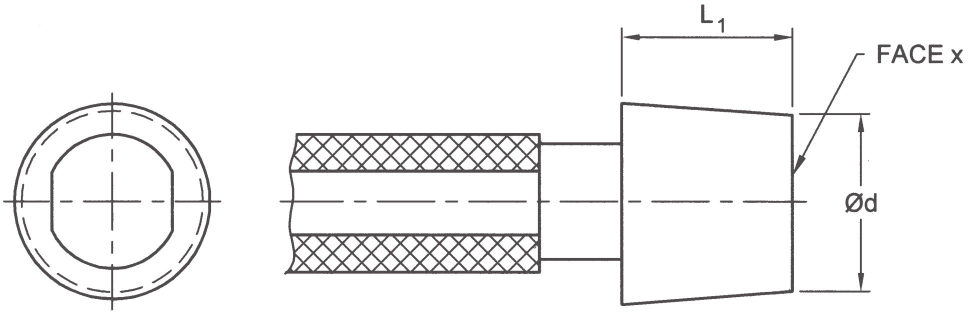
a) Check plug to be fully inserted on the working plain ring gauge. Care shall be taken not to use undue force.

b) Top face ‘*x*’ of the check plug should either flush with the face ‘*b*’ of the ring gauge or may protrude X_1 mm beyond the face ‘*b*’ of the ring gauge.

7 DIMENSION AND TOLERANCE FOR MASTER CHECK PLUG GAUGE

7.1 Dimension and Tolerance of Master Plain Check Plug Gauge for Checking Taper Plain Ring Gauges G and H

Master check plug for checking plain ring gauge for major diameter at small end (Gauge G) and major diameter at large end (Gauge H)



All dimensions in millimetres.

Nominal Size	*Dimension*	*Value*	*Tolerance*		*Taper*	*L_1+ Tolerance*	*X_1*
			Plus	*Minus*			
18.160	Cone diameter (*d*) at face *x*	17.941	0.0025	0	1 in 8 on diameter	20.800 + 0.100	0.120
25.400	Cone diameter (*d*) at face *x*	25.181	0.0025	0	1 in 8 on diameter	23.970 + 0.100	0.120
31.750	Cone diameter (*d*) at face *x*	31.461	0.0040	0	1 in 8 on diameter	30.890 + 0.100	0.184

7.1.1 *Methodology*

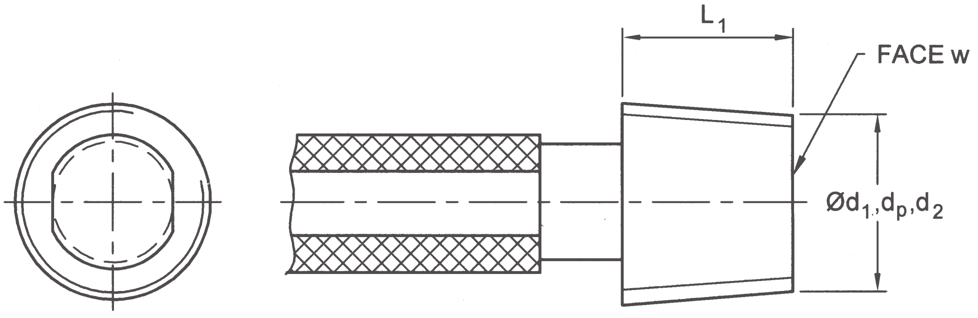
For using of the master check plug for checking plain ring gauges for major diameter at small end (Gauge G) and major diameter at large end (Gauge H):

a) Master check plug to be fully inserted on the working plain ring gauge. Care shall be taken not to use undue force.

b) Top face ‘*x*’ of the master check plug should either flush with the face ‘*b*’ of the ring gauge or may protrude X_1 mm beyond the face ‘*b*’ of the ring gauge.

7.2 Dimension and Tolerance of Master Thread Check Plug Gauge for Checking Taper Thread Ring Gauges E and F

Master check plug for full form (Gauge E) and effective form (Gauge F) taper thread ring gauges.



(FOR FORM OF THREAD SEE FIG. 1)

All dimensions in millimetres.

Nominal Size	*Dimension*	*Value*	*Tolerance*		*Taper*	*L_1 + Tolerance*	*W_1*
			Plus	*Minus*			
18.160	Major diameter(d_1) at face *w*	17.624	0	0.023	1 in 8 on diameter	19.050 + 0.100	0.120
	Pitch diameter(d_p) at face *w*	16.998	0.005	0			
	Minor diameter(d_2) at face *w*	Cleared	–	–			
25.400	Major diameter(d_1) at face *w*	24.863	0	0.023	1 in 8 on diameter	22.220 + 0.100	0.120
	Pitch diameter(d_p) at face *w*	24.237	0.005	0			
	Minor diameter(d_2) at face *w*	Cleared	–	–			
31.750	Major diameter(d_1) at face *w*	31.026	0	0.036	1 in 8 on diameter	28.580 + 0.100	0.184
	Pitch diameter(d_p) at face *w*	30.269	0.007	0			
	Minor diameter(d_2) at face *w*	Cleared	–	–			

7.2.1 *Methodology*

For using of the master check plug for checking full form (Gauge E) and effective form (Gauge F) taper thread ring gauges:

a) Master check plug to be fully screwed on the working thread ring gauge. Care shall be taken not to use undue force.

b) Top face '*w*' of the master check plug should either flush with the face of the ring gauge or may protrude W_1 mm beyond the face '*a*' of the ring gauge.

7.3 Checking of taper plain plug gauges and taper thread plug gauges shall be carried out directly by measurement using optical or other suitable equipment.

8 GENERAL REQUIREMENTS OF GAUGING SURFACES

8.1 Hardness

Rockwell C 60 to 62 when determined according to IS 1586.

8.2 Surface roughness of gauging portion shall be 0.2 microns (*Max*) (R_a value) when determined according to IS 3073.

8.3 Finish

The gauging surface shall be ground and suitably stabilized, the method of stabilizing shall be as per agreement between the manufacturer and the customer. Surfaces other than gauging surface to be finished smooth.

9 DESIGNATION

The gauges shall be designated by the following:

a) Nominal size of the valve/cylinder,
b) Gauge type, and
c) Number of this standard.

Example — A screw ring gauge for testing pitch diameter of taper stem for 18.16 mm valve size will be designated as 18.16 mm Gauge F, IS 7202.

10 CORROSION PROTECTION AND PACKING

Gauges shall be protected against climatic condition by application of any anti-corrosive coating. Packing shall be suitable to prevent damage in transit.

11 MARKING

11.1 The Gauge shall be marked with the following:

a) Nominal size of valve,
b) Gauge type and number of this standard,
c) Manufacturer name or trademark, and
d) Serial No. with the year of the manufacture.

11.2 BIS Certification Marking

Each gauge may also be marked with the Standard Mark.

11.2.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the license for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

ANNEX A

(Foreword)

COMMITTEE COMPOSITION

Gas Cylinders Sectional Committee, MED 16

Organization	*Representative (s)*
Petroleum and Explosive Safety Organization, Nagpur	Dr Sudarshan Kamal (***Chairman***) Shri Ashendra Singh (*Alternate*)
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